Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (currently amended): A method of determining ~~calculating~~ the flux of ~~an~~ gas~~(x)~~ "X" in a ~~CBC circuit for a~~ subject that is ventilated or ~~a spontaneous~~ breathing spontaneously, comprising the steps of: ~~subject,~~

~~for example said gas(x) being;~~

~~a) A anesthetic such as but not limited to;~~

~~i) N_2O;~~

~~ii) sevoflurane;~~

~~iii) isoflurane;~~

~~iv) halothane;~~

~~v) desflurame;~~

~~or the like~~

~~b) Oxygen;~~

~~c) Carbon dioxide;~~

~~or the like~~

a. providing to the subject, via a Conditional Breathing Circuit (CBC), a source gas and a second gas that has substantially the same concentration of gas "X" as in the alveoli of the lung, wherein the source gas for a given breath is provided at a flow rate (SGF) that results in the source gas entering the CBC being equal to or less than the subject's alveolar ventilation, any balance of the gas provided for the same breath being the second gas;

b. determining the flux of gas "X" by:

(i) determining the source gas flow (SGF) into the CBC;

(ii) determining the concentration, F_{SX}, of gas "X" in the source gas flow or F_{RBX};

(iii) determining the concentration, F_{EX}, of gas "X" in the end expired gas; and

(iv) processing data utilizing the ~~following~~ relationship~~s~~;:

Flux of gas "X"~~(x)~~ = SGF (F_{SX}-F_{EX});

Flux of gas "X"~~(x)~~ = SGF (F_{EX}-F_{SX}); or

Flux of gas "X" = SGF (F_{EX}- F_{RBX})

wherein:

SGF = the rate of Ssource ~~of~~ gas flow into the ~~breathing circuit~~ (CBC ~~circuit~~) in liters/minute ~~as read from the gas flow meter as set by the anesthesiologist~~;

F_{SX} = Fractional concentration of gas "X" in the source gas ~~(which is set by the anesthesiologist)~~;

F_{EX} = Fractional concentration of gas "X" in the end expired gas ~~as determined by a portable gas analyzer, or the like~~

F_{RBX}= Fractional concentration of gas "X" (where "X" is not carbon dioxide) in an expiratory limb of the CBC before gas enters a carbon dioxide absorber and mixes with source gas entering the circuit; and

the relationship Flux of gas "X" = SGF (F_{EX}- F_{RBX}) is employed when there is carbon dioxide absorber in the CBC.

Claim 2 (currently amended): ~~A~~ The method of claim 1, wherein the second gas is gas expired by the subject in the preceding breath ~~calculating the flux of oxygen in a CBC circuit for a ventilated and/or spontaneous breathing subject utilizing the following relationship:~~

~~Flux of oxygen = SGF (F_{SO2} – F_{EO2})~~

~~wherein~~

~~SGF = Source of gas flow into the breathing circuit (CBC circuit) in liters/minute as read from the gas flow meter as set by the anesthesiologist;~~

~~F_{SX} = Fractional concentration of gas O_2 in the source gas (which is set by the anesthesiologist);~~

~~F_{EX} = Fractional concentration of gas O_2 in the end expired gas as determined by a portable gas analyzer, or the like~~.

Claim 3 (currently amended): The method of claim 2~~1~~, wherein values for SGF, F_{SX} or F_{RBX} and F_{EX} are determined by a device comprising a gas flow meter and a tidal gas analyzer and wherein the data is processed by a processor operatively associated with the device ~~or 2 wherein the CBC circuit is selected from the group consisting of i) a circle circuit; ii) a Magill breathing circuit; iii) an isocapnia circuit, whether breathing or non-breathing (as taught by co-pending Fisher et al), or the like~~.

Claim 4 (currently amended): The method of claim 1, ~~or 2~~ wherein the Conditional Breathing Circuit ~~CBC~~ is an ~~improved~~ Magill circuit. ~~as described herein~~

Claim 5 (currently amended): The method of claim 1, ~~or 2~~ wherein the Conditional Breathing Circuit is an ~~improved~~ rebreathing circuit.

Claim 6 (currently amended): The method of claim 1, ~~or 2~~ wherein the CBC circuit is an ~~improved~~ non-rebreathing circuit, ~~as described herein.~~

Claim 7 (currently amended): The method of claim 2 used to determine oxygen consumption. ~~measure cardiac out put by any known method, such as the Fick method~~.

Claim 8 (currently amended): The method of claim 2 used to determine oxygen consumption in~~,~~ ~~for example,~~ an operating room setting ~~or the like~~.

Claim 9 (original): The method of claim 2 or 8 used to optimize oxygen consumption.

Claim 10 (original): The method of claim 2 or 8 utilized as an early indication of malignant hyperthermia.

Claim 11 (currently amended): A method of determining~~calculating~~ the flux of any gas other than carbon dioxide~~,~~ in a subject by using a Conditional Breathing Circuit (CBC) ~~circuit~~ with ~~low gas flow of~~ a source gas flow (SGF) resulting in source gas entering the CBC being equal to or less than alveolar ventilation and with a carbon dioxide absorber in place utilizing the following relationship;

Flux of gas X = SGF (FEX – FRBX)

wherein

SGF = Source of gas flow into the breathing circuit (CBC circuit) in liters/minute as read from the gas flow meter as set by the anesthesiologist;

F_{EX} = Fractional concentration of gas X in the end expired gas as determined by a portable gas analyzer, or the like.

F_{RBX} = Concentration of gas X in the expired limb of circuit before the gas passes through the carbon dioxide absorber and mixes with gas coming from the flow meter.

Claim 12 (cancelled):

Claim 13 (original): The method of claim 11 used to determine how much anesthetic is being absorbed by the patient.

Claim 14 (original): The method of claim 13 wherein said anesthetic is N_2O.

Claim 15 (cancelled):

Claim 16 (cancelled):

Claim 17 (cancelled):

Claim 18 (original): The method of claims 1, 2, or 11 used to calculate the rate of elimination of a gas X for any input total gas flow utilizing the following further relationships;

wherein the rate of elimination of gas X = the input total gas flow (multiplied by) F_{EX}-FI_X ;

wherein F_{EX} is defined above and F_{IS} is the concentration of X in inspired gas.

Claim 19 (previously presented): The method of claim 1, 2, or 11, ~~15, 16 or 17~~ wherein said method is incorporated in an algorithm spreadsheet, formula or the like contained within software which is capable of running on a computing device, or is installed therein.

Claim 20 (new): The method of claim 1, wherein the gas "X" is carbon dioxide and the CBC is a re-breathing circuit.

Claim 21 (new): The method of claim 1, wherein the gas "X" is an anesthetic and the CBC is a re-breathing circuit.

Claim 22 (new): The method of claim 21, wherein the anesthetic is:

i) N_2O;
ii) sevoflurane;
iii) isoflurane;
iv) halothane;
v) desflurame.

Claim 24 (new): The method of claim 1, wherein the CBC circuit is selected from the group consisting of i) a circle circuit; ii) a Magill breathing circuit; or iii) an isocapnia circuit, (rebreathing or non-rebreathing).

Claim 25 (new): An apparatus configured for use with a Conditional Breathing Circuit (CBC) for determining the flux of a gas "X" in a subject that is ventilated or breathing spontaneously, comprising:

c. at least one gas analyzer;

d. a gas flow meter for determining the rate of flow of a source gas;

e. a processor programmed for:

(i) determining the source gas flow (SGF) into the CBC;

(ii) determining the concentration, F_{SX}, of gas "X" in the source gas flow or F_{RBX};

(iii) determining the concentration, F_{EX}, of gas "X" in the expired gas; and

(iv) processing data utilizing the relationship:

Flux of gas "X" = SGF (F_{SX}-F_{EX});

Flux of gas "X" = SGF (F_{EX}-F_{SX}); or

Flux of gas "X" = SGF (F_{EX}- F_{RBX})

wherein:

SGF = the rate of source gas flow into the CBC in liters/minute;

F_{SX} = Fractional concentration of gas "X" in the source gas;

F_{EX} = Fractional concentration of gas "X" in the end expired gas;

F_{RBX}= Fractional concentration of gas "X" (where "X" is not carbon dioxide) in an expiratory limb of the CBC before gas enters a carbon dioxide absorber and mixes with gas entering the circuit under control of the gas flow meter;

the relationship Flux of gas "X" = SGF (F_{EX}- F_{RBX}) is employed when there is carbon dioxide absorber in the CBC.

Claim 26 (new): An apparatus according to claim 25 in the form of an anesthetic machine wherein gas "X" is an anesthetic gas and wherein the CBC includes a carbon

dioxide absorber and wherein the processor is configured to determine consumption of the anesthetic gas using the relationship Flux of gas "X" = SGF (F_{EX}- F_{RBX}).

Claim 27 (new): An apparatus according to claim 25 further comprising a CBC.

Claim 28 (new): The use of a conditional breathing circuit (CBC) for determining the flux of a gas "X" in a subject that is ventilated or breathing spontaneously, comprising the steps of:

a. analyzing the concentration of gas "X" in the end tidal gas;
b. controlling the rate of flow of a source gas;
c. determining the concentration, F_{SX}, of gas "X" in the source gas flow or F_{RBX};
d. processing data utilizing the relationship:

Flux of gas "X" = SGF (F_{SX}-F_{EX});
Flux of gas "X" = SGF (F_{EX}-F_{SX}); or
Flux of gas "X" = SGF (F_{EX}- F_{RBX})

wherein:

SGF = the rate of source gas flow into the CBC in liters/minute;
F_{SX} = Fractional concentration of gas "X" in the source gas;
F_{EX} = Fractional concentration of gas "X" in the end expired gas;
F_{RBX}= Fractional concentration of gas "X" (where "X" is not carbon dioxide) in an expiratory limb of the CBC before gas enters a carbon dioxide absorber and mixes with gas entering the circuit under control of the gas flow meter;
the relationship - Flux of gas "X" = SGF (F_{EX}- F_{RBX}) is employed when there is carbon dioxide absorber in the CBC.

Claim 29 (new): A processor programmed for receiving source gas flow rate data and gas concentration data generated by a gas analyzer, and programmed for:

(v) determining the source gas flow (SGF) into a CBC;

(vi) determining the concentration, F_{SX}, of gas "X" in the source gas flow or F_{RBX};

(vii) determining the concentration, F_{EX}, of gas "X" in the expired gas; and

(viii) processing data utilizing the relationship:

Flux of gas "X" = SGF (F_{SX}-F_{EX});

Flux of gas "X" = SGF (F_{EX}-F_{SX}); or

Flux of gas "X" = SGF (F_{EX}- F_{RBX})

wherein:

SGF = the rate of source gas flow into the CBC in liters/minute;

F_{SX} = Fractional concentration of gas "X" in the source gas;

F_{EX} = Fractional concentration of gas "X" in the end expired gas;

F_{RBX}= Fractional concentration of gas "X" in an expiratory limb of the CBC before gas enters a carbon dioxide absorber and mixes with gas entering the circuit under control of the gas flow meter;

the relationship Flux of gas "X" = SGF (F_{EX}- F_{RBX}) is employed when there is carbon dioxide absorber in the CBC.